CURRICULUM VITAE
University of Idaho

NAME: Bryn A. Martin

DATE: June 6, 2017

RANK OR TITLE: Assistant Professor

DEPARTMENT: Biological Engineering

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DATE OF FIRST EMPLOYMENT AT UI: August 10, 2015

DATE OF TENURE: Untenured

DATE OF PRESENT RANK OR TITLE: August 10, 2015

EDUCATION BEYOND HIGH SCHOOL:

Degrees:

PhD	Mechanical Engineering, University of Illinois at Chicago	Chicago, Illinois, U.S.A.	2008
MS	Mechanical Engineering, University of Illinois at Chicago	Chicago, Illinois, U.S.A.	2005
BS	Mechanical Engineering, University of Illinois at Chicago	Chicago, Illinois, U.S.A.	2002

Certificates and Licenses:

Accelerated course and certification for management of tech. start-ups, EPFL, Switzerland	2009
Certified Electronics Technician training at Technology Center of DuPage, Addison, IL	1998

EXPERIENCE:

Teaching, Extension and Research Appointments:

Assistant Professor, Department of Biological Engineering, University of Idaho, ID	2015 –
Faculty, University of Washington, WWAMI Regional Medical Education Program (Idaho)	2016 –
Joint Faculty, Mechanical Engineering, University of Idaho, ID	2015 –
Joint Faculty, Neuroscience, University of Idaho, ID	2015 –
Joint Faculty, Biology, Bioinformatics and Computational Biology, University of Idaho, ID	2015 –
Research Assistant Professor, Department of Mechanical Engineering, University of Akron, OH	2013 – 2015
Director, Conquer Chiari Research Center, University of Akron, OH	2012 – 2015
Scientist, Swiss Federal Institute of Technology, EPFL, Lausanne, Switzerland	2011 – 2012
Postdoctoral Fellow, Swiss Federal Institute of Technology, EPFL, Lausanne, Switzerland	2009 – 2011

Academic Administrative Appointments: None.

Non-Academic Employment including Armed Forces:

Baxter Healthcare Biosurgery, Round Lake, IL: Industrial Project Research Assistant	2007
Motorola Biomonitoring Group, Schaumburg, IL: Industrial Project Research Assistant	2005 – 2006
R&D internships (3-month) at Hospira new product technologies ’07, Baxter global R&D ’05, Motorola ’04, Sencons Sensors and Controllers design engineering ’02 and electronics technician ’01	2001 – 2005

Consulting:

Cerebral Therapeutics, Boulder, CO: Consultant for intra-ventricular drug delivery	2017 –
Minnetronix, Minneapolis, MN: Consultant for intrathecal drug delivery	2016 –
Alcyone Lifesciences, Concord, MA: Consultant for medical device	2016 –
Voyager Therapeutics, Cambridge, MA: Consultant for MRI assessment of intrathecal drug delivery	2014 – 2015
Medtrad Biosystems, Palo Alto, CA: Design consultant for anthropomorphic bioreactor	2011
Neurosyntec, Los Gatos, CA: Neurohydrodynamics consultant for funded NSF SBIR grant	2010 – 2011

TEACHING ACCOMPLISHMENTS:

Areas of Specialization:

Cerebrospinal fluid dynamics, Biofluid Mechanics, Biomechanics, Biomedical Imaging, Instrumentation and Measurements, Neural Engineering.

Courses Taught:

University Courses Taught (100%)

BE 404/504	*Medical Imaging Techniques and Applications*, Enrollment = 4, University of Idaho, Moscow, ID	2017 S
ISEM 301	*Tech Startup Entrepreneurship*, Enrollment = 26, University of Idaho, Moscow, ID	2017 S
BE 404/504	*Neural Engineering*, Enrollment = 4, University of Idaho, Moscow, ID	2016 F
BE 404/504	*Medical Imaging Techniques and Applications*, Enrollment = 7, University of Idaho, Moscow, ID	2016 S

WWAMI Teaching (10% FTE)

WWAMI	*Basic imaging of the chest, radiographs and CT*, Univ. of Washington Medical School	2017 S
WWAMI	*Pulmonary chest radiograph interpretation*, Univ. of Washington Medical School	2017 S
WWAMI	*Ultrasound Imaging Physics and Applications*, Univ. of Washington Medical School	2016 S
WWAMI	*Ultrasound Imaging Spring Break Training Module*, Univ. Washington Medical School	2016 S
WWAMI	*Human Form and Function Module - Imaging*, Univ. of Washington Medical School	2016 F
WWAMI	*Breast Cancer Imaging*, Univ. of Washington Medical School	2016 F

Engineering Design Project Mentorship

BE 479	*Engineering Design,* Project Sponsor "Neurotouch", University of Idaho, Moscow, ID	2017 S
BE 479	*Engineering Design,* Project Sponsor "Biological Pump", University of Idaho, Moscow, ID	2017 S
BE 479	*Engineering Design,* Project Sponsor "CSF system", University of Idaho, Moscow, ID	2016 SF

University Undergraduate Research Courses Taught (100%)

BE 499	*Neuroengineering Research*, Enrollment = 2, University of Idaho, Moscow, ID	2017 S
BE 499	*Neuroengineering Research*, Enrollment = 2, University of Idaho, Moscow, ID	2016 F
BE 499	*Neuroengineering Research*, Enrollment = 1, University of Idaho, Moscow, ID	2016 S
BIOL 401	*Undergraduate Student Research*, Enrollment = 1, University of Idaho, Moscow, ID	2015 F

Course Interactive Learning Field Trips Organized

INBRE	*Onboarding tour*, IRIC Neurophysiological Imaging and Modeling Laboratory	2017 S
ISEM 101	*Lab tour*, IRIC Neurophysiological Imaging and Modeling Laboratory	2017 S
BE 404/504	*Integrated Sports Medicine and Rehabilitative Therapy Clinic*, Moscow, ID	2017 S
BE 404/504	*MR imaging facility tour*, Gritman Medical Center, Moscow, ID	2017 S
BE 404/504	*MR imaging facility tour*, Gritman Medical Center, Moscow, ID	2016 S
BE 404/504	*Neurorehabilitation tour*, St. Luke's Rehabilitation Institute tour, Spokane, WA	2016 F

Continuing Medical Education (CME) accredited teaching lectures

Accredited by the Accreditation Council for Continuing Medical Education (ACCME)

1. "Engineering-based Methods for Static and Dynamic Assessment of Chiari malformation" XXIX ASAP Conference on Chiari I Malformation, Syringomyelia, and Related Disorders (Uniondale, NY, 6/20-23, 2017).
2. "Cerebellar and Brain Stem Deformation Assessment of Chiari Malformation" American Society of Neuroradiology (Washington D.C., U.S.A., 5/27/2016).
3. "Neurophysiological Imaging and Modeling in Health and Disease" University of Washington, Department of Neurosurgery (Seattle, WA, 12/2/2015).
4. "Cerebrospinal fluid dynamics in the spinal subarachnoid space," Neuroscience Forum, European Continuing Medical Training (Lausanne, Switzerland, 02/7-8, 2014).
5. "Coupled neurohydrodynamic modeling of the cardiovascular and cerebrospinal fluid system: insights gained and challenges that remain," European continuing medical training Neuroscience Forum, (Domaine de Divonne, Divonne-les-Bains, France, 12/16-17, 2011).

Students Advised:

Undergraduate Students

2017 advised to completion of degree = 0
2016 advised to completion of degree = 0
2015 advised to completion of degree = 0

Current student advisees

8 Undergraduate
2 PhD
1 MS

Current Doctoral Candidates

Ph.D.	M. Khani	University of Idaho, Biological Enginering	Spring 2016 – Present	Major Professor
Ph.D.	L. Sass	University of Idaho, Biological Enginering	Fall 2016 – Present	Major Professor
Ph.D.	S. Pahlavian	University of Akron, Mech. Enginering	Fall 2013 – Present	Committee Member

Current Master's Candidates

M.S.	J. Rohr	University of Idaho, Biological Engineering	Fall 2016 – Present	Major Professor

Current Undergraduate Trainees

B.S.	A. Sass	University of Idaho, Computer Science	Fall 2015 – Present	Research Supervisor
B.S.	S. Sater	University of Idaho, Biological Enginering	Spring 2017 – Present	Research Supervisor
B.S.	C. Majors	University of Idaho, Mechanical Enginering	Spring 2017 – Present	Research Supervisor
B.S.	B. Aldrimk	University of Idaho, Mechanical Enginering	Spring 2017 – Present	Research Supervisor
B.S.	L. Hold	University of Idaho, Biological Enginering	Spring 2017 – Present	Research Supervisor
B.A.	J. Oles	University of Idaho, Virtual Tech. & Design	Spring 2017 – Present	Research Co-supervisor

Engineering Grand Challenge Scholar Trainees

B.S.	T. Freeman	University of Idaho, Computer Science	Fall 2015 – Present	Grand Scholar Mentor
B.S.	G. Conley	University of Idaho, Biological Engineering	Fall 2015 – Present	Grand Scholar Mentor

Current Medical School Trainees

Braden Lawrence	University of Washington, Medical Program	Fall 2016 – Present	MSRTP Mentor

Completed Doctoral Students

Ph.D. S. Thyagaraj University of Akron Spring 2016 Co-Supervisor / Committee
- Dissertation: "In Vitro Investigation of CSF Dynamics in Chiari Malformation by 4D MRI"
- Current Position: Post-doctoral fellow, Case Western Reserve

Ph.D. S. Ashaat Auckland U. of Tech. Fall 2012 – 2015 Committee Member
- Dissertation: "Understanding upper airway dynamic characteristics in OSA patients under treatment"
- Current Position: Lecturer in Refrigeration and Air Conditioning at Manukau Institute of Technology

Ph.D. N. Shaffer The University of Akron Fall 2015 Co-Supervisor / Committee
- Dissertation: "MRI-Based Computational Modeling of CSF Dynamics in Chiari Malformation"
- Current Position: Quality Control Engineer, Cleveland, Ohio.

Ph.D. T. Yiallourou EPFL, Switzerland Fall 2012 – 2014 Co-Director / Committee
- Dissertation: "Subject-Specific CFD modeling and measurement of CSF motion in the cervical spine"
- Current Position: Omeros Corporation, Senior Scientist, Seattle, Washington.

Ph.D. K. Shahim EPFL, Switzerland Fall 2009 – 2011 Co-Supervisor / Committee
- Dissertation: "Bio Simulation of Brain Ventricle Dilation in Normal Pressure Hydrocephalus"
- Current Position: Postdoctoral Fellow, Inst. for Surgical Technology and Biomechanics, U. of Bern

Completed Master's Students

M.S. S. Mei University of Idaho 6/2016 – 12/2016 Major Professor / Research Supervisor
- Thesis: N/A, transferred to another advisor.

M.S. S. Pahlavian University of Tehran Spring 2012 – 2013 Research Co-Supervisor
- Thesis: "Numerical simulation of spinal cord nerve roots impacts on cervical CSF
- Current Position: Ph.D. student at the University of Akron

M.S. B. Anthikat KTH Royal Inst. of Tech. Fall 2011 Thesis Co-Supervisor
- Thesis: "Continuous Positive Airway Pressure Impacts Cerebral Blood Flow and CSF Motion"

M.S. E. Coppens EPFL Fall 2010 Thesis Co-Supervisor
- Thesis: "Assessment of the Impact of Placing An Aortic Graft Upon the Hemodynamics"

• Current Position: Ph.D. student at Katholieke Universiteit Leuven, KLIP

M.S. A. Picquot Institut Supérieur de Mécanique Fall 2010 Thesis Co-Supervisor
• Thesis: "An in vivo MRI and CFD simulation of CSF hydrodynamics in the third ventricle"
• Current Position: Production and Maintenance Managers Assistant at Holcim

M.S. E. Farine EPFL, Switzerland Spring 2012 4-month Project Supervisor
• Thesis Project Report: "Measurement of Brain Volume Change Due to Acute Modification of ICP"
• Current Position: Ph.D. student at Swiss Federal Institute of Technology

M.S. A. Chiki EPFL, Switzerland Spring 2012 4-month Project Supervisor
• Thesis Project Report: "Lumbar spine cerebrospinal fluid velocity measurements in tethered cord"

M.S. A. Hirsch EPFL, Switzerland Fall 2011 4-month Project Supervisor
• Thesis Project Report: "Construction of a 3D Model of the Spinal Subarachnoid Space"
• Current Position: Ph.D. student at Swiss Federal Institute of Technology

M.S. L. Asboth EPFL, Switzerland Spring 2011 4-month Project Supervisor
• Thesis Project Report: "Comparison of 4D MRI flow measurements and 3D CFD simulation of CSF"
• Current Position: Ph.D. student at Swiss Federal Institute of Technology

M.S. C. Meuli EPFL, Switzerland Spring 2011 4-month Project Supervisor
• Thesis Project Report: "Pulse Wave Velocity in the Spinal Subarachnoid Space"
• Current Position: Ph.D. student at Swiss Federal Institute of Technology

Completed Undergraduate Research Students

B.S.	J. Pluid	University of Idaho	Fall 2015 – Summer 2016	Research Supervisor
B.S.	C. Gibbs	University of Idaho	Fall 2015 – Summer 2016	Research Supervisor
B.S.	M. Vinicius	University of Idaho	Fall 2015 – Spring 2016	Research Supervisor
B.S.	A. Elliott	University of Idaho	Fall 2015 – Summer 2016	Research Supervisor
B.S.	V. Gomm	University of Idaho	Summer 2016	Research Supervisor
B.S.	M. V da Silva	University of Idaho	Fall 2015 – Spring 2016	Research Supervisor
B.S.	J. Havrilak	The University of Akron	Fall 2014 – Spring 2015	Senior Design Supervisor
B.S.	V. Traviso	The University of Akron	Summer 2014	Research Supervisor
B.S.	M. Dailey	The University of Akron	Fall 2014 – Spring 2015	Senior Design Supervisor
B.S.	D. Lemmer	The University of Akron	Summer 2014	Senior Design Supervisor
B.S.	L. Kostan	The University of Akron	Summer 2014	Research Supervisor
B.S.	J. Schlafer	Brown University	Summer 2014	Research Supervisor
B.S.	V. Traviso	The University of Akron	Summer 2014	Research Supervisor
B.S.	G. Margida	Grinnell College	Summer 2014	Research Supervisor
B.S.	R. Kenyon	The University of Akron	Spring 2013	Research Supervisor
B.S.	M. Wransky	The University of Akron	Fall 2013 – Spring 2014	Research Co-Supervisor
B.S.	D. McQuaide	Iowa State University	Fall 2013 – Summer 2014	Research Supervisor
B.S.	I. Pitteloud	EPFL	Spring 2013	Research Supervisor
B.S.	M. Majcher	The University of Akron	Fall 2012 – Spring 2013	Research Supervisor
B.S.	R. Kenyon	The University of Akron	Spring 2013	Research Supervisor
B.S.	J. Chishko	The University of Akron	Fall 2012	Research Supervisor
B.S.	J. Lazzara	The University of Akron	Fall 2012	Research Supervisor
B.S.	S. Metrailler	EPFL	Spring 2011	Research Supervisor
B.S.	A. DeMuralt	EPFL	Spring 2010	Research Supervisor
B.S.	G. Muller	EPFL	Spring 2010	Research Supervisor

Completed Medical Student Trainees

B.S.	P. MartyNE	Ohio Medical Univ.	Summer 2014	Research Supervisor

Completed High School Student Trainees

H.S.	N. Allen	The University of Akron	Summer 2014	Summer Research Supervisor
H.S.	D. McQuaide	The University of Akron	Summer 2013	Summer Research Supervisor
H.S.	M.Lowenkamp	The University of Akron	Summer 2013	Summer Research Supervisor
H.S.	J. Loth	The University of Akron	Summer 2013	Summer Research Supervisor

Materials Developed: (non-scholarship activity)

BBLearn Online Lecture Notes and Videos (21 lectures) for Medical Imaging Techniques and Applications 2016
BBLearn Online Lecture Notes and Videos (21 lectures) for Neural Engineering 2016

Courses Developed:

ISEM 301	*Tech Startup Entrepreneurship*, University of Idaho, Moscow, ID	2017 S
BE 404/504	*Neural Engineering*, University of Idaho, Moscow, ID	2016 F
BE 404/504	*Medical Imaging Techniques and Applications*, University of Idaho, Moscow, ID	2016 S

Non-credit Classes, Workshops, Seminars, Invited Lectures, etc.:

BE 142	*Course lecture*, Engineering for Living Systems, University of Idaho, Moscow, ID	2016 F
BE 142	*Course lecture*, Engineering for Living Systems, University of Idaho, Moscow, ID	2015 F
ISEM 101	*Course lecture*, Engineering Grand Challenges, University of Idaho, Moscow, ID	2017 S

Honors and Awards:

Appointed Joint Faculty, Neurosurgery, University of Washington, WA	2016 –
Appointed Joint Faculty, California Institute of Neuroscience, CA	2017 –
Appointed Joint Faculty, National Skull Base Center, CA	2017 –

SCHOLARSHIP ACCOMPLISHMENTS:

B0. Publication summary

- 34 peer-reviewed full-length journal publications [B1.1-33]
- 5 peer-reviewed publications presently under review
- Corresponding author (denoted with **Martin BA*)** for 16 peer-reviewed full-length journal publications.
- Three review papers in cerebrospinal fluid dynamics
- Scopus: 279 citations by 154 documents with h-index = 11, as of 6/6/2017, ID: 8683613700
- 50 peer-reviewed documents indexed in Scopus: http://www.scopus.com/authid/detail.url?authorId=8683613700

B1. Peer reviewed full-length journal publications

B1.1 Houston JR, Loth DM, Allen PA, Eppelheimer MS, Pahlavian SH, Braun A, Biswas D, **Martin BA**, Urbizu A, Labuda R, Bapuraj R, Luciano MG, Elias JJ, Loth F, "*Morphometric assessment of type 1 Chiari malformation above the McRae line: a retrospective case-control study in 302 adult female subjects*." Journal of Neuroradiology (Accepted).

B1.2 Khani M, Xing T, Gibbs C, Oshinski J, Stewart GR, Zeller JR, **Martin BA*** (2017), "*Non-uniform Moving Boundary Method for Simulation of Intrathecal Cerebrospinal Fluid Dynamics in a Cynomolgus Monkey*." Journal of Biomechanical Engineering, Published.

B1.3 Urbizu A, **Martin BA**, Moncho D, Rovira A, Poca MA, Sahuquillo J, Macaya A, Espanol MI (2017)"*Machine learning applied to neuroimaging identifies the basion as a key morphometric indicator of adult classic Chiari malformation."* J Neurosurg, Published.

B1.4 Haga PT, Pizzichelli G, Mortensen M, Kuchta M, Heidari Pahlavian S, Sinibaldi E, Mardal, K., **Martin BA*** (2017), "*A numerical investigation of intrathecal drug and gene vector dispersion within the cervical subarachnoid space*." PlosONe, Published.

B1.5 Yildiz S, Thyagaraj S, Ning J, Xiaodong Z, Heidari-Pahlavian S, **Martin BA**, Loth F, Sabra K, Oshinski JN (2017), *"Quantifying the Influence of Respiration and Cardiac Pulsations on the Cerebrospinal Fluid Dynamics Using Real- Time Phase-Contrast MRI."* Journal of Magnetic Resonance Imaging, Published.

B1.6 Urbizu A, Ferre A, Poca MA, Rovira A, Sahuquillo J, **Martin BA**, Macaya A (2016), "Cephalometric oropharynx and oral cavity analysis in Chiari malformation Type I: a retrospective case-control study." J Neurosurg: 1-8.

B1.7 Alves T, Ibrahim E, **Martin BA**, Malyarenko D, Maher C, Muraszko K, Garton HJ, Srinivasan A, Bapuraj RJ (2016), "Principles, Techniques, and Clinical Applications of Phase Contrast Magnetic Resonance Cerebrospinal Fluid Imaging." Neurographics, Published.

B1.8 Pahlavian SH, Bunck AC, Thyagaraj S, Giese D, Loth F, Hedderich DM, Kroeger JR, **Martin BA*** (2016), "Accuracy of 4D Flow measurement of cerebrospinal fluid dynamics in the cervical spine: An in vitro verification against numerical simulation." Ann Biomed Eng, In Press.

B1.9 Bapuraj RJ, Londy FJ, N. D, C.O. M, **Martin BA**, Muraszko K, J. QD (2016), "Cerebrospinal fluid velocity amplitudes within the aqueduct of Sylvius in pediatric healthy subjects and patients with Chiari I malformation." Journal of Magnetic Resonance Imaging, In Press.

B1.10 **Martin BA***, Yiallourou TI, Pahlavian SH, Loth F, Bunck AC, Shaffer N, Kroeger JR, Stergiopulos N (2015), "Inter-Operator Dependence of Magnetic Resonance Image-Based Computational Fluid Dynamics Prediction of Cerebrospinal Fluid Motion in the Cervical Spine." Annals of Biomedical Engineering, Published.

B1.11 Pahlavian SH, Loth F, Oshinski JN, Luciano MG, **Martin BA*** (2015), "Cardiac related neural tissue motion impacts cerebrospinal fluid dynamics at the cervical-medullary junction: a patient-specific moving-boundary computational fluid dynamics model of type 1 Chiari malformation." Annals of Biomedical Engineering.

B1.12 Yiallourou T, Schmid Daners M, Kurtcuoglu V, Haba-Rubio J, Heinzer R, Fornari E, Santini F, Sheffer DB, Stergiopulos N, **Martin BA*** (2015), "Continuous positive airway pressure alters cranial blood flow and cerebrospinal fluid dynamics at the craniovertebral junction." Interdisciplinary Neurosurgery, 2: 152-159.

B1.13 Pahlavian SH, Bunck AC, Loth F, Tubbs RS, Yiallourou T, Kroeger JR, Heindel W, **Martin BA*** (2015), "Characterization of the Discrepancies between Four-Dimensional Phase-Contrast Magnetic Resonance Imaging and In-Silico Simulations of Cerebrospinal Fluid Dynamics." Journal of Biomechanical Engineering-Transactions of the Asme, In Press.

B1.14 Luciano MG, **Martin BA**, Allen P, Loth F (2015), "The squeeze of Chiari malformation, clinicians and scientists collaborate to understand its cause and effects." Pediatric Neuroscience Pathways.

B1.15 Heidari Pahlavian S, Yiallourou T, Tubbs RS, Bunck AC, Loth F, Goodin M, Raisee M, **Martin BA*** (2014), "The impact of spinal cord nerve roots and denticulate ligaments on cerebrospinal fluid dynamics in the cervical spine." PLoS One, 9: e91888.

B1.16 Allen PA, Houston JR, Pollock JW, Buzzelli C, Li X, Harrington AK, **Martin BA**, Loth F, Lien MC, Maleki J, Luciano MG (2014), "Task-specific and general cognitive effects in Chiari malformation type I." PLoS One, 9: e94844.

B1.17 Yiallourou TI, Odier C, Heinzer R, Hirt L, **Martin BA**, Stergiopulos N, Haba-Rubio J (2013), "The effect of continuous positive airway pressure on total cerebral blood flow in healthy awake volunteers." Sleep and Breathing, 17: 289-296.

B1.18 Shaffer N, **Martin BA**, Rocque B, Madura C, Wieben O, Iskandar B, Dombrowski S, Luciano M, Oshinski J, Loth F (2013), "Cerebrospinal Fluid Flow Impedance is Elevated in Type I Chiari Malformation." J Biomech Eng.

B1.19 **Martin BA***, Kutluay U, Yazicioglu Y (2013), "Method for Dynamic Material Property Characterization of Soft-Tissue-Mimicking Isotropic Viscoelastic Materials Using Fractional Damping Models." Journal of Testing and Evaluation, 41: 804-812.

B1.20 **Martin BA***, Kalata W, Shaffer N, Fischer P, Luciano M, Loth F (2013), "Hydrodynamic and longitudinal impedance analysis of cerebrospinal fluid dynamics at the craniovertebral junction in type I Chiari malformation." PLoS One, 8: e75335.

B1.21 **Martin BA***, Allen PA (2013), "Where do we stand on the relationship between tau biomarkers and mild cognitive impairment?" Quantitative Imaging in Medicine and Surgery, 3: 189-191.

B1.22 Elliott NSJ, Bertram CD, **Martin BA**, Brodbelt AR (2013), "Syringomyelia: A review of the biomechanics." Journal of Fluids and Structures, 40: 1-24.

B1.23 Bunck AC, Kroeger JR, Juettner A, Brentrup A, Fiedler B, Crelier GR, **Martin BA**, Heindel W, Maintz D, Schwindt W, Niederstadt T (2012), "Magnetic resonance 4D flow analysis of cerebrospinal fluid dynamics in Chiari I malformation with and without syringomyelia." Eur Radiol, 22: 1860-1870.

B1.24 **Martin BA***, Reymond P, Novy J, Baledent O, Stergiopulos N (2012), "A coupled hydrodynamic model of the cardiovascular and cerebrospinal fluid system." Am J Physiol Heart Circ Physiol, 302: H1492-1509.

B1.25 Shahim K, Drezet JM, **Martin BA**, Momjian S (2012), "Ventricle equilibrium position in healthy and normal pressure hydrocephalus brains using an analytical model." J Biomech Eng, 134: 041007.

B1.26 Vardoulis O, Coppens E, **Martin BA**, Reymond P, Tozzi P, Stergiopulos N (2012), "Response to comments regarding Vardoulis O, et al., Impact of Aortic Grafts on Arterial Pressure: A Computational Fluid Dynamics Study. Eur J Vasc Endovasc Surg 2011;42:704-10." European Journal of Vascular and Endovascular Surgery, 43: 238-239.

B1.27 Yiallourou TI, Kroger JR, Stergiopulos N, Maintz D, Bunck AC, **Martin BA*** (2012), "Comparison of 4D phase-contrast MRI flow measurements to computational fluid dynamics simulations of cerebrospinal fluid motion in the cervical spine." PLoS One, 7: e52284.

B1.28 Shaffer N, **Martin BA**, Loth F (2011), "Cerebrospinal fluid hydrodynamics in type I Chiari malformation." Neurol Res, 33: 247-260.

B1.29 Vardoulis O, Coppens E, **Martin BA**, Reymond P, Tozzi P, Stergiopulos N (2011), "Impact of Aortic Grafts on Arterial Pressure: A Computational Fluid Dynamics Study." European Journal of Vascular and Endovascular Surgery, 42: 704-710.

B1.30 **Martin BA***, Labuda R, Royston TJ, Oshinski JN, Iskandar B, Loth F (2010), "Spinal Subarachnoid Space Pressure Measurements in an In Vitro Spinal Stenosis Model: Implications on Syringomyelia Theories." Journal of Biomechanical Engineering-Transactions of the Asme, 132.

B1.31 Kalata W, **Martin BA**, Oshinski JN, Jerosch-Herold M, Royston TJ, Loth F (2009), "MR Measurement of Cerebrospinal Fluid Velocity Wave Speed in the Spinal Canal." IEEE Trans Biomed Eng.

B1.32 **Martin BA***, Loth F (2009), "The influence of coughing on cerebrospinal fluid pressure in an in vitro syringomyelia model with spinal subarachnoid space stenosis." Cerebrospinal fluid research, 6: 17.

B1.33 Yazicioglu Y, Royston TJ, Spohnholtz T, **Martin BA**, Loth F, Bassiouny HS (2005), "Acoustic radiation from a fluid-filled, subsurface vascular tube with internal turbulent flow due to a constriction." Journal of the Acoustical Society of America, 118: 1193-1209.

B1.34 **Martin BA***, Kalata W, Loth F, Royston TJ, Oshinski JN (2005), "Syringomyelia hydrodynamics: An in vitro study based on in vivo measurements." Journal of Biomechanical Engineering-Transactions of the Asme, 127: 1110-1120.

B2. Publications under review *(full text provided upon request)*

B2.1 Khalsa SS, Geh N, **Martin BA**, Allen P, Strahle J, Loth F , Habtzghi D , Serrano AU, McQuaide D, Garton H, Dr. Muraszko K, Maher C, "*Morphometric and volumetric comparison of 102 children with symptomatic and asymptomatic Chiari malformation type I.*" (Under Review).

B2.2 Sharp MK, Carare R, **Martin BA**, "*Dispersion in porous media in oscillatory flow between flat plates: Applications to intrathecal and perivascular solute transport in the central nervous system*." (Under Review).

B2.3 Thyagaraj S, Pahlavian SH, Loth F, Vatani M, Choi J, Tubbs RS, Giese D, Kroger J, Bunck AC, **Martin BA***, "*An MRI-Compatible Hydrodynamic Simulator of Cerebrospinal Fluid Motion in the Cervical Spine*." (Under Review).

B2.4 Ashaat SA, Al-Jumaily A, **Martin BA**, Pohle-Krauza R, Krauza ML, "*Biomechanical Assessment of Obstructive Sleep Apnea Pre and Post Bariatric Surgery*." (Under Review).

B2.5 Pizzichelli G, Kehlet B, Evju Ø, **Martin BA**, Rognes ME, Mardal KA, Sinibaldi E, "Numerical study of intrathecal drug delivery to a permeable spinal cord: effect of catheter position and angle." (Under Review).

B3. Peer-reviewed extended conference proceedings (greater than 2 pages)

B3.1 Loth F, Pahlavian SH, Amini R, Shaffer N, **Martin BA**, Zhong X, Oshinski J, "Computational Tools to Assess Impedance, Pressure and Strain for Subjects With Chiari Malformation," 5th International Conference on Computational and Mathematical Biomedical Engineering – CMBE2017 (Pittsburgh, PA, USA, 4/10-12, 2017)

B3.2 **Martin BA***, Yiallourou TI, Stergiopulos N, "Quantitative comparison of 4D MRI flow measurements to 3D CFD simulation of cerebrospinal fluid movement in the spinal subarachnoid space," International Conference on Computational Fluid Dynamics in Medicine and Biology (Dead Sea, Israel, 03/25-30, 2012).

B3.3 Yiallourou TI, Asboth L, Kroeger JR, Maintz D, Bunck AC, **Martin BA**, Stergiopulos N, "Quantitative comparison of 4D MRI flow measurements to 3D CFD simulation of cerebrospinal fluid movement in the spinal subarachnoid space," 10th International Workshop on Biomedical Engineering (Kos, Greece, 10/5-7, 2011).

B3.4 Yazicioglu Y, **Martin BA**, Navarro K, Royston TJ, "Transverse vibration of pre-stressed beams: An experimental technique for the determination of dynamic viscoelastic material properties of tissue mimicking materials," 152nd Meeting of the Acoustical Society of America (Paris, France, 5/29-6/4, 2008).

C1. Keynote and grand rounds lectures

C1.1 "Neurophysiological Imaging and Modeling in Health and Disease" University of Washington, Department of Neurosurgery, Grand Rounds (Seattle, WA, 12/2/2015).

C1.2 "Characterization and modeling of Chiari malformation," National Institutes of Health (NIH), National Institutes of Neurological Disorders and Stroke, Grand Rounds (Bethesda, MD, 11/13, 2014).

C1.3 "Progress in Chiari malformation research at the University of Akron," Akron General Hospital Post-grad Research Symposium (Akron, OH, 06/06, 2013).

C1.4 "Syringomyelia biomechanics," NIH – National Institute of Neurological Disorders and Stroke, Grand Rounds (Bethesda, Maryland, 2/5, 2008).

C2. Invited lectures (*published as conference abstracts)

C2.1 "Biophysics of Chiari malformation" 13th Symposium of the International Hydrocephalus Imaging Working Group (Kobe, Japan, 9/25-26, 2017).

C2.2 "MRI-based quantification of CSF dynamics in ALS patients: a prospective case-control study" Inland Northwest Movement Disorder Society, 3rd Annual Meeting (Spokane, WA, 9/7-8, 2017).

C2.3 "Engineering-based Methods for Static and Dynamic Assessment of Chiari malformation" American Syringomyelia and Chiari Alliance Project Annual Conference (Long Island, NY, 7/20-23, 2017)*.

C2.4 "Are monkeys like humans? Comparison of intrathecal CSF dynamics across mammalian species" International Cerebrospinal Fluid Dynamics Society (Atlanta, Georgia, 6/19-20/2017)*.

C2.5 "MRI Assessment of CSF Dynamics and Geometry in Non-human Primates" International Society for Hydrocephalus and Cerebrospinal Fluid Disorders (ISHCSF) (Cartagena, Colombia, 10/10/2016)*.

C2.6 "Cerebellar and Brain Stem Deformation Assessment of Chiari Malformation" American Society of Neuroradiology (Washington D.C., U.S.A., 5/27/2016)*.

C2.7 "Measurement and Modeling of Intracranial Fluid Dynamics and Morphology" Washington State University (Spokane, WA, 01/11/2016).

C2.8 "Reliability of 4D Phase Contrast MRI for detection of CSF flow velocities" IHIWG / ISHCSFD Conference (Banff, Canada, 9/18, 2015).

C2.9 "How reliable is phase-contrast MRI detection of CSF flow in Chiari malformation?" American Syringomyelia and Chiari Alliance Project Annual Conference (Ann Arbor, MI, 7/22-25, 2015).

C2.10 "Assessment of cephalometric measurement reliability in type 1 Chiari malformation," American Society of Neuroradiology, CSF flow study group (Chicago, IL, 5/1, 2015).

C2.11 "Characterization and modeling of cerebrospinal fluid dynamics in health and disease," Medtronic Neuro Forum Internal Lecture (Minneapolis, MN, 3/6, 2015).

C2.12 "Reliability of CSF flow detection in Chiari malformation: an in vitro assessment of 4D phase-contrast MRI," American Syringomyelia and Chiari Alliance Project (ASAP) Annual Meeting, University of Michigan (Ann Arbor, MI, 7/22-25, 2015).

C2.13 "Biomechanical characterization of Chiari malformation: morphometrics, CSF dynamics, and neuromechanics," Conquer Chiari Research Conference (Akron, OH, 11/8-9, 2014).

C2.14 "In vitro comparison of 4D and 2D PC MRI assessment of CSF dynamics," International Hydrocephalus Imaging Working Group (IHIWG) (Bristol, UK, 9/5-6, 2014).

C2.15 "Measurement and modeling of cerebrospinal fluid dynamics in health and disease," Voyager Therapeutics (Cambridge, MA, 7/9, 2014).

C2.16 "Characterization and modeling of cerebrospinal fluid dynamics in Chiari Malformation," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014)*.

C2.17 "Cerebrospinal fluid dynamics in the spinal subarachnoid space," Neuroscience Forum, European Continuing Medical Training (Lausanne, Switzerland, 02/7-8, 2014).

C2.18 "Characterization and modeling of cerebrospinal fluid dynamics: a field rich in complexity with many questions to answer," 7th World Congress on Biomechanics (Boston, Ma, U.S.A., 07/6-11, 2014)*.

C2.19 "Spinal cord nerve roots and denticulate ligaments alter CSF dynamics in the upper cervical spine," 2nd International CSF dynamics symposium (Manhasset, New York, U.S.A., 06/24-25, 2013)*.

C2.20 "Engineering insights into CSF flow dynamics at the craniovertebral junction," 51st Annual Meeting and The Foundation of the American Society of Neuroradiology Symposium, Hydrocephalus and CSF flow group meeting (San Diego, CA, 05/18-23, 2013).

C2.21 "The importance of cerebrospinal fluid dynamics in craniospinal disorders," University of Illinois at Chicago, Department of Biomedical Engineering Lecture Series (Chicago, IL, 05/03, 2013).

C2.22 "Chiari what? Using engineering principles to help understand biomechanics of a rare brain disorder called Chiari malformation," University of Akron, Research for Lunch Lecture Series (Akron, Ohio, 03/13, 2013).

C2.23 "4D MRI applied to the investigation of Chiari & syringomyelia," Conquer Chiari Research Conference (Chicago, IL, 11/8-9, 2012).

C2.24 "Neurohydrodynamics in the cervical spine," American Syringomyelia and Chiari Alliance Project Research Conference, Children's National Medical Center (Washington D.C., 07/18-21, 2012).

C2.25 "4D MRI quantification of CSF velocities with comparison to computational fluid dynamics simulations," American Society of Neuroradiology 50th Annual Meeting, CSF and Hydrocephalus Study Group (New York, 04/26-27, 2012).

C2.26 "Research trends in neurohydrodynamics," Nagoya Institute of Technology symposium on bioengineering, (Nagoya, Japan, 03/08, 2012).

C2.27 "Coupled neurohydrodynamic modeling of the cardiovascular and cerebrospinal fluid system: insights gained and challenges that remain," European continuing medical training Neuroscience Forum, (Domaine de Divonne, Divonne-les-Bains, France, 12/16-17, 2011).

C2.28 "Neurohydrodynamics: an engineering perspective," Department of Neuroradiology at the University Hospital of Münster, (Münster, Germany, 8/25, 2011).

C2.29 "Simulation of CSF in the spinal subarachnoid space and spinal cord blood flow," 1st International Cerebrospinal Fluid Engineering Conference, (Zurich, Switzerland, 7/22-25, 2011)*.

C2.30 "In vitro modeling of syrinx progression," Conquer Chiari Research Conference: New Developments and Controversies (Chicago, IL, 11/12, 2010).

C2.31 "Cerebrospinal fluid biomechanics: an engineering perspective," Service de Neurologie Maladies Cérébro-Vasculaires, Centre Hospitalier Universitaire Vaudois (Lausanne, Switzerland 09/31, 2010).

C2.32 "In vitro modeling of the spinal subarachnoid space," 6th World Congress on Biomechanics (Singapore, 09/1-6, 2010)*.

C2.33 "An engineering analysis of syringomyelia," University of Illinois at Chicago, Department of Radiology, MRI Research Laboratory (Chicago, Illinois, 10/24, 2008).

C2.34 "In vitro syringomyelia hydrodynamics," Ecole Polytechnique Fédérale de Lausanne (Lausanne, Switzerland, 9/16, 2008).

C3. Conference presentations with published abstracts

C3.1 Sass LR, Khani M, Gibbs C, Freeman T, Pluid J, Elliott A, Oshinski JN, Zeller J, Stewart GR, Powell D, Petersen B, Weeks D, Carter G, Martin BA, "Quantitative assessment of intrathecal cerebrospinal fluid dynamics and geometry across large mammalian species," Hydrocephalus 2017 (Kobe, Japan, 10/23-25/2017).

C3.2 Sass LR, Conley G, Cleveley B, Khani M, Xing T, Baledent O, Martin BA, "Neurochi: A virtual reality and in vitro model of the CSF system for teaching and research," Hydrocephalus 2017 (Kobe, Japan, 10/23-25/2017).

C3.3 Sharp MK, Martin BA, Carrare R, "Analytic Darcy-Brinkman model for prediction of Shear-augmented dispersion in the BAsement Membranes and spinal subarachnoid space," International Cerebrospinal Fluid Dynamics Society (Atlanta, Georgia, 6/19-20/2017).

C3.4 LR Sass, M Khani, O Baledent, BA Martin, "An in vitro model of intrathecal cerebrospinal fluid dynamics with dorsal and ventral spinal cord nerve rootlets," Summer Bioengineering, Biomechanics and Biotransport (Tucson, AZ, 6/21-24, 2017).

C3.5 Sharp MK, Carrare R, Martin BA, "Shear-Augmented Dispersion Affects Cerebrospinal Fluid Solute Transport in the Subarachnoid Space but not within the Basement Membranes in the Brain," Summer Bioengineering, Biomechanics and Biotransport (Tucson, AZ, 6/21-24, 2017).

C3.6 Khani M, Xing T, Gibbs C, Oshinski J, Stewart GR, Zeller JR, Martin BA, "CFD model and MRI measurement of intrathecal cerebrospinal fluid dynamics in a cynomolgus monkey," PhD Student Paper Finalist, Biomechanics – Fluids, Summer Bioengineering, Biomechanics and Biotransport (Tucson, AZ, 6/21-24, 2017).

C3.7 Nelson ES, Myers JG, Lewandowski B, Feola AJ, Werner C, Raykin J, Martin BA, Samuels B, Ethier CR, "Ocular modeling for VIIP syndrome: how experimental and numerical studies can collaborate," NASA Human Research Program Investigators Workshop (Galveston, TX, 1/24, 2017).

C3.8 Martin BA, Loth F, Luciano MG, "CSF fluid dynamics in Chiari malformation: a MRI study of longitudinal impedance," International Society for Hydrocephalus and CSF Disorders (Cartagena, Colombia, 10/8-11, 2016).

C3.9 Bapuraj JR, Londy FJ, Martin BA, Ibrahim EH, Maher CO, Garton HJ, Muraszko KM, "New Parameters for Assessing CSF flow at the Cerebral Aqueduct and Craniovertebral Junction in Normal Subjects and Pediatric Chiari I malformations," American Society of Neuroradiology (Washington D.C., U.S.A., 4/26-27, 2016).

C3.10 Loth F, Shaffer N, Pahlavian SH, Luciano MG, Oshinski JN, "Quantitative Assessment of the Differences in the Resistance to Spinal CSF Motion in Chiari Malformation," 3rd bi-annual meeting of the International CSF dynamics society (Amiens, France, 7/9-10, 2015).

C3.11 Martin BA, Shaffer N, Oshinski JN, Luciano MG, Loth F, "Neural tissue deformation and cerebrospinal fluid flow impedance are positively correlated at the craniocervical junction," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).

C3.12 Majcher MJ, Dailey MR, Lemmer DP, Havrilak JT, Leipzig N, Martin BA, "Design of a 3D bioreactor for simulation of cerebrospinal fluid flow in the third ventricle and aqueduct of sylvius," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).

C3.13 Pahlavian SH, Loth F, Luciano MG, Martin BA, "A patient specific computational model to characterize the impact of neural tissue motion on cerebrospinal fluid dynamics at the cervical-medullary junction," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).

C3.14 Thyagaraj S, Giese D, Santini F, Fornari E, Bunck AC, Loth F, Martin BA, "Multicenter comparision of 4D phase contrast MRI measurement of cerebrospinal fluid dynamics in the cervical spine," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).

C3.15 Al-Jumaily A, Ashaat S, Martin BA, Pohle-Krauza R, Krauza ML, "Bariatric surgery improvements for obstructive sleep apnea patients," Summer Bioengineering Biotransport and Biomechanics Meeting (Snowbird, UT, USA, 6/17-20, 2015).

C3.16 Loth F, Martin BA, Pahlavian S, Shaffer N, Oshinski JN, Luciano MG, "CFD simulation of cerebrospinal fluid motion to assess Chiari malformation severity," International conference on CFD in medicine and biology (Albufeira, Portugal, 9/30-10/4, 2015).

C3.17 Marty P, Urbizu A, Macaya A, Sahuquillo J, Poca MA, Martin BA, "Gender-specific differences in adult type I Chiari malformation morphometrics," 67th Meeting of the American Academy of Neurology (Washington, DC, 4/18-25, 2015).

C3.18 Luciano M, Martin BA, Loth F, "Is Chiari malformation a structure or a movement? Cleveland Clinic-Conquer Chiari Collaboration," Chiari and Syringomyelia Foundation Research Colloquium (Boston, MA, 10/18, 2014).

C3.19 Bapuraj R, Martin BA, "2D PC MRI assessment of Chiari malformation" International Hydrocephalus Imaging Working Group (IHIWG) (Bristol, UK, 9/5-6, 2014).

C3.20 Kroger JR, Thyagaraj S, Giese D, Hedderich D, Morsdorf-Shulte RL, Maintz DC, Yiallourou TI, Bunck AC, Martin BA, "4D-phase-contrast evaluation of cerebrospinal fluid dynamics in a rigid-wall 3D printed in-vitro model of Chiari I Malformation with idealized spinal cord nerve roots," 100th Meeting of the Radiological Society of North America (Chicago, IL, 11/30-12/5, 2014).

C3.21 Pahlavian SH, Bunck AC, Tubbs RS, Yiallourou TI, Loth F, Martin BA, "4D phase-contrast magnetic resonance imaging of cerebrospinal fluid velocities in the cervical spine and quantitative comparison to computational fluid dynamics," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).

C3.22 Thyagaraj S, Pahlavian SH, Vatani M, Choi J, Goodin M, Bunck AC, Yiallourou TI, Loth F, Martin BA, "3D printed model for simulation of cerebrospinal fluid motion in the cervical spinal subarachnoid space," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).

C3.23 Shaffer N, Martin BA, Dombrowski S, Luciano MG, Tew JM, Loth F, "Investigation of post-surgical changes to cerebrospinal fluid flow impedance in type I Chiari malformation patients," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).

C3.24 Alves T, Bapuraj JR, Malyarenko D, Martin BA, Srinivasan A, "Principles, Techniques and Clinical Applications of Phase Contrast MRI Cerebrospinal Fluid Imaging," 52nd Annual Meeting and The Foundation of the ASNR Symposium (Montreal, Canada, 5/17-22) *submitted*.

C3.25 Mortensen M, Mardal KA, Pahlavian SH, Martin BA, "Preliminary study of the impact of spinal cord nerve roots and denticulate ligaments on drug movement in the cervical spinal subarachnoid space," 11th World Congress on Computational Mechanics (WCCM XI), 5th European Conference on Computational Mechanics (ECCM V), 6th European Conference on Computational Fluid Dynamics (ECFD VI) (Barcelona, Spain, 6/20-25, 2014)

C3.26 Yiallourou TI, Luciano M, Loth F, Bunck AC, Stergiopulos N, Martin BA, "Inter-operator dependence of subject specific CFD modeling of cerebrospinal fluid dynamics at the craniocervical junction," International Society for Magnetic Resonance in Medicine (Milan, Italy, 5/10-16, 2014).

C3.27 Martin BA, Shaffer N, Lowenkamp M, Loth F, Tew JM, Luciano MG, "Clinical importance of neural tissue deformation in type I Chiari malformation," American Society of Pediatric Neurosurgeons (Costa Rica, 1/26-31, 2014).

C3.28 Shaffer N, Martin BA, Dombrowski S, Luciano MG, Tew JM, Oshinski JN, Loth F, "Quantitative Assessment of the Differences in Spinal CSF Dynamics in Chiari Malformation," 2nd International CSF dynamics symposium (Manhasset, New York, U.S.A., 6/24-25, 2013).

C3.29 Shaffer N, Martin BA, Rocque B, Madura C, Iskandar B, Wieben O, Dombrowski S, Luciano MG, Oshinski JN, Loth F, "The relation of cerebrospinal fluid flow impedance and cerebellar herniation in type I Chiari malformation," ASME Summer Bioengineering Conference (Sun River, Oregon, U.S.A., 6/26-29, 2013).

C3.30 Al-Jumaily AM, Ashaat S, Martin BA, Heinzer R, Haba-Rubio J, Stergiopulos N, "Uvula dynamic characteristics," ASME Summer Bioengineering Conference (Sun River, Oregon, U.S.A., 6/26-29, 2013).

C3.31 Bertram CD, Elliott NSJ, Martin BA, Brodbelt AR, "The contribution of engineering modelling to the understanding of syringomyelia pathogenesis: a review," Syringomyelia 2013 (Sydney, Australia, 2/27-3/1, 2013).

C3.32 Bapuraj JR, Londy F, Maher CO, Martin BA, Quint DJ, Sundgren PA, Chenevert TC, Muraszco KA, "Dynamic MRI and quantitative MRI CSF flow studies in Chiari I malformations," Conquer Chiari Research Conference (Chicago, IL, 11/8-9, 2012).

C3.33 Bapuraj JR, Londy F, Maher CO, Martin BA, Quint DJ, Sundgren PA, Chenevert TC, Muraszco KA, "The influence of neck position on CSF velocities at the cranio-cervical junction and the aqueduct of Sylvius in healthy subjects and pre- and post-operative patients with Chiari I malformation," American Society of Neuroradiology 50th Annual Meeting (New York, NY, 4/21-26, 2012).

C3.34 Martin BA, Yiallourou TI, Stergiopulos N, "Quantitative comparison of 4D MRI flow measurements to 3D computational fluid dynamics simulation of cerebrospinal fluid movement in the spinal subarachnoid space," International Conference on Computational Fluid Dynamics in Medicine and Biology (Dead Sea, Israel, 3/25-30, 2012).

C3.35 Yiallourou TI, Odier C, Martin BA, Haba-Rubio J, Heinzer R, Hirt L, Stergiopulos N, "The effect of continuous positive airway pressure on total cerebral blood flow in 23 healthy away volunteers," 10th International Workshop on Biomedical Engineering (Kos, Greece, 10/5-7, 2011).

C3.36 Yiallourou TI, Asboth L, Kroeger JR, Maintz D, Bunck AC, Martin BA, Stergiopulos N, "Quantitative comparison of 4D MRI flow measurements to 3D computational fluid dynamics simulation of cerebrospinal fluid movement in the spinal subarachnoid space," 10th International Workshop on Biomedical Engineering (Kos, Greece, 10/5-7, 2011).

C3.37 Martin BA, Novy J, Balédent O, Reymond P, Stergiopulos N, "Prediction of spinal cord perivascular flow based on a coupled computational simulation of the cardiovascular and cerebrospinal fluid system," International Society for Hydrocephalus and Cerebrospinal Fluid Disorders (Copenhagen, Denmark, 9/3-7, 2011).

C3.38 Shahim K, Drezet JM, Martin BA, Molinari JF, Momjian SH, "Analytical model of normal pressure hydrocephalus," Swiss Federal Institute of Technology – EPFL, Material Science and Engineering EDMX Research Symposium (Lausanne, Switzerland, 3/17, 2011).

C3.39 Martin BA, Reymond P, Balédent O, Novy J, Stergiopulos N, "A coupled simulation of spinal cord blood flow and cerebrospinal fluid motion in the spinal subarachnoid space based on in vivo measurements," ASME Summer Bioengineering Conference (Farmington, Pa, 6/22-25, 2011).

C3.40 Vardoulis O, Coppens E, Martin BA, Reymond P, Stergiopulos N, "Assessment of aortic graft impact on hemodynamics," ASME Summer Bioengineering Conference (Farmington, Pa, 6/22-25, 2011).

C3.41 Picquot A, Santini F, Block J, Fonari E, Martin BA, Stergiopulos N, "A comparison of 4D MRI flow measurements and 3D computational fluid dynamics simulation of cerebrospinal fluid movement in the brain ventricles," International Society for Magnetic Resonance in Medicine Annual Meeting (Montréal, Canada, 5/7-13, 2011).

C3.42 Martin BA, F. Loth, "In vitro hydrodynamic modeling of syringomyelia," International Symposium on Syringomyelia (Berlin, Germany 12/09-11, 2010).

C3.43 Martin BA, P. Reymond, F. Loth, N. Stergiopulos, "A 1-D coupled model of the cardiovascular tree and cerebrospinal fluid system," 6th World Congress on Biomechanics (Singapore, 9/1-6, 2010).

C3.44 Y. Liu, Martin BA, T. J. Royston, "A series of in silico fluid structure interaction simulations of the cerebrospinal fluid pressure wave propagation in the spinal subarachnoid space," ASME 2010 International Mechanical Engineering Congress & Exposition (Vancouver, Canada, 11/12-18, 2010).

C3.45 Martin BA, "Device and method for non-invasive measurement of vascular properties," TechConnect medtech IP submission (Anaheim, CA, June 21-25, 2010).

C3.46 Y. Liu, Martin BA, T. J. Royston, F. Loth, "A fluid structure interaction simulation of the cerebrospinal fluid, spinal cord, and spinal stenosis present in syringomyelia," ASME Summer Bioengineering Conference (Naples, FL, 6/16-19, 2010).

C3.47 Martin BA, S. El-Khoury, F. Loth, "The Influence of cerebrospinal fluid flow frequency and magnitude on subarachnoid space pressure fluctuations in an in vitro syringomyelia model with spinal canal stenosis," Biomedical Engineering Society Annual Meeting (Pittsburgh, Pa, 10/7-10, 2009).

C3.48 Martin BA, F. Loth, T. J. Royston, "The interrelation of cerebrospinal fluid pulse wave velocity and biomechanical properties of the spinal canal," 10th US National Congress on Computational Mechanics, Mechanics of biological Tissues Mini-Symposium (Columbus, Ohio, 7/16-19, 2009).

C3.49 Martin BA, F. Loth, "The influence of coughing on cerebrospinal fluid pressure in an in vitro syringomyelia model with spinal canal stenosis," ASME Summer Bioengineering Conference (Lake Tahoe, CA, 6/17-21, 2009).

C3.50 F. Loth, Martin BA, "Engineering & imaging techniques," American Syringomyelia Alliance Project Annual Conference (Washington D.C., July, 2008).

C3.51 F. Loth, Martin BA, "Engineering & imaging techniques," Chiari Research Conference 2008, State of the Research and New Directions (Chicago, IL, 11/6-7, 2008).

C3.52 Martin BA, Wojciech Kalata, Francis Loth, John N. Oshinski, Michael Jerosch-Herold, "MR measurement of pulse wave velocity in the spinal canal," ASME Summer Bioengineering Conference (Marco Island, FL, 6/25-29, 2008).

C3.53 Martin BA, "Syringomyelia apparatus demonstration," UIC/Conquer Chiari Research Symposium (Chicago, Illinois, 6/2, 2007).

C3.54 W. Kalata, Martin BA, F. Loth, T. J. Royston, J. N. Oshinski, Jerosch-Herold, "Measurements of pulse wave velocity in the spinal canal," Biomedical Engineering Society Annual Meeting (Chicago, Illinois, 10/11-14, 2006).

C3.55 Martin BA, W. Kalata, F. Loth, T.J. Royston, J. N. Oshinski, "An engineering approach to understanding the hydrodynamics of syringomyelia," ASAP Annual National Conference (Cedar Rapids, Iowa, 7/20-23, 2005).

C3.56 T. Spohnholtz, T. J. Royston, Y. Yaziciolgu, Martin BA, F. Loth, H. Bassiouny, "A multimode sonic & ultrasonic diagnostic imaging system with application to peripheral vascular characterization," 149th Meeting of the Acoustical Society of America (Vancouver, Canada, 5/16-20, 2005).

C3.57 W. Kalata, Martin BA, F. Loth, J. N. Oshinski, "Differences in cerebrospinal fluid motion in Chiari malformation patients and healthy volunteers," 3rd Annual Neural Hydrodynamics Symposium (Cleveland, OH, 5/12-14, 2005).

C3.58 Martin BA, W. Kalata, F. Loth, J. N. Oshinski, T. J. Royston, "Experimental syringomyelia hydrodynamics: the importance of pressure phase relation on syrinx pathogenesis," 3rd Annual Neural Hydrodynamics Symposium (Cleveland, OH, 5/12-14, 2005).

C3.59 Martin BA, W. Kalata, F. Loth, T. J. Royston, J. N. Oshinski, "An experimental investigation of the hydrodynamic and biomechanical environment present in syringomyelia," ASME Summer Bioengineering Conference (Vail, CO, 5/22-26, 2005).

C3.60 Martin BA, W. Kalata, J. N. Oshinski, F. Loth, "An engineering perspective on syringomyelia," ASAP Annual National Conference (Key Biscayne, FL, 6/21-24, 2004).

C3.61 Martin BA, W. Kalata, T.J. Royston, J. N. Oshinski, F. Loth, "Experimental study on pressure and hydrodynamic flow within the subarachnoid space," 2nd Symposium of Neural Hydrodynamics (Menlo Park, CA, 5/1, 2004).

C3.62 Martin BA, F. Loth, J. N. Oshinski, "Physical characterization of pressure wave transmission in a fluid filled syrinx," Proceedings of the Neurohydrodynamic Symposium (6/1, 2004).

C3.63 Martin BA, W. Kalata, J. N. Oshinski, F. Loth, "Importance of mechanical forces in the development of syringomyelia for patients with Chiari malformation," ASAP Annual Conference (New York City, NY, 7/1, 2003).

C3.64 Martin BA, W. Kalata, J. N. Oshinski, F. Loth, "Engineering perspective on diseases related to CSF motion," University of Chicago in the Department of Neurosurgery Grand Rounds (Chicago, IL, 6/6, 2003).

C4. Conference posters

C4.1 Sater S, Sass A, Aldrimk B, Rohr J, Stenger M, Macias B, Martin BA, "Reliability assessment of Optic Nerve Trajectory in Long-duration Space Flight Astronauts," University of Idaho, Undergraduate Student Research Symposium (Moscow, ID, 4/24, 2017).

C4.2 Conley G, Cleveley B, Sass L, Xing T, Baledent O, Kurtcuoglu V, Martin BA, "A 3D Anatomic Model of the Intracranial Cerebrospinal Fluid System Based on MRI Measurements and Neurosurgical Literature Review," University of Idaho, Undergraduate Student Research Symposium (Moscow, ID, 4/24, 2017).

C4.3 Majors C, Aldrimk B, Sass L, Martin BA, "Prototype 3D-printed Oscillatory Flow Pump for Simulation of Cerebrospinal Fluid Flow," University of Idaho, Undergraduate Student Research Symposium (Moscow, ID, 4/24, 2017).

C4.4 G. Conley Natividad, B. Cleveley, LR Sass, T Xing, O Baledent, V Kurtcuoglu, BA Martin, "Neuroculus virtual reality simulator of the cerebrospinal fluid system," Undergraduate Student Paper Competition Finalist, Summer Bioengineering, Biomechanics and Biotransport (Tucson, AZ, 6/21-24, 2017).

C4.5 MV DaSilva Ferreira, BA Martin, "MRI-based assessment of cerebrospinal fluid pulse wave velocity in the upper cervical spine," University of Idaho Undergraduate Research Symposium (Moscow, ID, 2016).

C4.6 M. Wransky, D. McQuaide, J. Strahle, C. O. Maher, M. Espanol, F. Loth, BA Martin, "Machine learning and morphometric analysis of asymptomatic and symptomatic Type 1 Chiari malformation patients," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).

C4.7 S. H. Pahlavian, A. C. Bunck, R. S. Tubbs, T. Yiallourou, F. Loth, BA Martin, "Quantitative Comparison of 4D Phase-Contrast Magnetic Resonance Imaging and Subject-Specific Computational Fluid Dynamics Simulation of Cerebrospinal Fluid Velocities in Cervical Spine," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).

C4.8 S. Thyagaraj, S.H. Pahlavian, M. Vatani, J. Choi, M. Goodin, A. Bunck, T. Yiallourou, F. Loth, BA Martin, "3D printed model of the cervical spine for simulation of cerebrospinal fluid motion: comparison of in vitro and computational fluid dynamics simulation results," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).

C4.9 N. Shaffer, BA Martin, S. Dombrowski, M. Luciano, J. Tew, F. Loth, "Investigation of post-surgical changes to cerebrospinal fluid hydrodynamics in type I Chiari malformation patients," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).

C4.10 M. Majcher, N. Shaffer, F. Loth, M. Luciano, J. Oshinski, B. Martin, "Quantification of neural tissue deformation in type 1 Chiari malformation patients pre- and post-spinal decompression surgery and comparison to controls," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).

C4.11 D. Casey, BA Martin, G. Bateman, S. H. Pahlavian, N. Shaffer, K. Smith Jr., F. Loth, "Numerical Simulation of Superior Sagittal Sinus Hemodynamics," World Congress on Biomechanics, American Society of Mechanical Engineers Summer Bioengineering Conference (Boston, MA, 7/5-11, 2014).

C4.12 M. Wransky, M. Espanol, A. Urbizu, F. Loth, BA Martin, "Machine learning for the detection of type 1 Chiari malformation without using tonsillar herniation measurement," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).

C4.13 R. Kenyon, S. Thyagaraj, N. Leipzig, F. Loth, BA Martin, " An in vitro hydrodynamic model of the spinal subarachnoid space with arachnoid trabeculae," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).

C4.14 M. Majcher, N. Shaffer, F. Loth, M. Luciano, J. Tew, M. Lowenkamp, BA Martin, "Quantification of axial spinal cord displacement in type 1 Chiari malformation," Midwest American Society of Biomechanics Regional Meeting (Akron, OH, 3/4-5, 2014).

C4.15 M. Majcher, N. Shaffer, F. Loth, M. Luciano, J. Oshinski, BA Martin, "Measurement of brain and spinal cord tissue motion in type 1 Chiari malformation by phase contrast magnetic resonance imaging," University of Akron Student Innovation Symposium (Akron, OH, 4/10, 2014).

C4.16 Chen T, Lowenkamp M, Shaffer N, and B Martin. "Syrinx Formation over 1 week in Chiari I Malformation: CSF velocity quantification before and after surgery," AANS/CNS Section on Pediatric Neurological Surgery (Toronto, Canada, 12/2013).

C4.17 M. Wransky, M. Espanol, B. Martin, "MRI-based Classifiers in Chiari Malformation," Midstates Conference for Undergraduate Research in Computer Science and Mathemathics (Delaware, OH, U.S.A., 11/16, 2013).

C4.18 S.H. Pahlavian, T.I. Yiallourou, R. S. Tubbs, A. Bunck, M. Goodin, F. Loth, M. Raisee, Martin BA, "Cerebrospinal fluid dynamics in the cervical spine: importance of fine anatomical structures," ASME Summer Bioengineering Conference (Sun River, Oregon, U.S.A., 6/26-29, 2013).

C4.19 Martin BA, N. Stergiopulos, "Prediction of the impact of craniospinal compliance on the relative timing of arterial and cerebrospinal fluid pulsations and perivascular fluid flow into the spinal cord," ASME Summer Bioengineering Conference (Fajardo, Puerto Rico, 6/20-23, 2011).

C4.20 T. Yiallourou, A. Bunck, J. Kroeger, N. Stergiopulos, Martin BA, "4D MRI flow quantification of cerebrospinal fluid motion in the cervical spine in healthy subjects and Chiari malformation patients: how do the results compare with 3D computational fluid dynamics?," ASME Summer Bioengineering Conference (Fajardo, Puerto Rico, 6/20-23, 2011).

C4.21 B. D. Anthikat-Alpert, T. Yiallourou, J. Haba-Rubio, R. Heinzer, E. Fonari, N. Chevrey, F. Santini, N. Stergiopulos, Martin BA, "Continuous positive airway pressure impacts cerebral blood flow and cerebrospinal fluid motion: a phase contrast MRI study," ASME Summer Bioengineering Conference (Fajardo, Puerto Rico, 6/20-23, 2011).

C4.22 T. I. Yiallourou, C. Odier, Martin BA, J. Haba-Rubio, R. Heinzer, L. Hirt, N. Stergiopulos, "The effect of continuous positive airway pressure on total cerebral blood flow in 23 healthy away volunteers," ASME Summer Bioengineering Conference (Farmington, Pa, 6/22-25, 2011).

C4.23 Martin BA, T. J. Royston, J. N. Oshinski, F. Loth, "Towards non-invasive assessment of the elastic properties of the spinal aqueduct," ASME Summer Bioengineering Conference (Lake Tahoe, CA, 6/17-21, 2009).

C4.24 Martin BA, R. Labuda, T. J. Royston, J. N. Oshinski, B. Iskandar, F. Loth, "Pathological biomechanics of cerebrospinal fluid pressure in syringomyelia: fluid structure interaction of an in vitro coaxial elastic tube system," ASME Summer Bioengineering Conference (Lake Tahoe, CA, 6/17-21, 2009).

C4.25 Martin BA, J. Seil, F. Loth, S. McCormack, T. J. Royston, "Epithelial cell growth on compliant biomaterial (Nusil CF11)," Biomedical Engineering Society Annual Meeting (Chicago, Illinois, 10/11-14, 2006).

C4.26 E. Mason, Martin BA, Y. Yazicioglu, F. Loth, T. J. Royston, I. Nicolaescu, "In vitro and in vivo piezoelectric sensor for measurement of pulse wave velocity," Biomedical Engineering Society Annual Meeting (Chicago, Illinois, 10/11-14, 2006).

C4.27 Martin BA, W. Kalata, F. Loth, J. N. Oshinski, T. J. Royston, "Characterization of pressure wave transmission in a fluid filled syrinx," Biomedical Engineering Society Annual Meeting (Chicago, Illinois, 10/11-14, 2006).

C4.28 T. Spohnholtz, T. J. Royston, Y. Yaziciolgu, Martin BA, F. Loth, H. Bassiouny, "Helping doctors interpret the sound of blood using a multimode sonic and ultrasonic imaging system," 149th Meeting of the Acoustical Society of America, lay language paper (Vancouver, Canada, 5/16-20, 2005).

C4.29 Y. Yazicioglu, T. J. Royston, T. Spohnholtz, Martin BA, F. Loth, H. Bassiouny, "Coupled vibration and sound radiation from a fluid-filled and submerged or embedded vascular tube with internal turbulent flow due to a constriction," 149th Meeting of the Acoustical Society of America (Vancouver, Canada, 5/16-20, 2005).

C4.30 W. Kalata, Martin BA, et. al, "Hydrodynamics of cerebrospinal fluid in spinal canal with Chiari malformation and syringomyelia," Bioengineering Session, American Society of Mechanical Engineers National Conference (Anaheim, CA, 11/13-19, 2004).

C4.31 Martin BA, W. Kalata, J. N. Oshinski, F. Loth, T. J. Royston, "Construction and validation of a complaint model of the cerebrospinal fluid system with fluid filled syrinx," 2004 ASME International Mechanical Engineering Congress & Exposition (Anaheim, CA ,11/13-19, 2004).

C4.32 W. Kalata, Martin BA, F. Loth, T. J. Royston, J. N. Oshinski, "Hydrodynamics of cerebrospinal fluid in spinal canal with Chiari malformation and syringomyelia," Bioengineering Poster Session, American Society of Mechanical Engineers National Conference (Anaheim, CA, 11/13-19, 2004).

C4.33 Y. Yazicioglu, T. J. Royston, T. Spohnholtz, Martin BA, F. Loth, "Coupled vibration of a fluid-filled and submerged vascular tube with internal transitional / turbulent flow due to a constriction," in Proceedings of the 148th Meeting of the Acoustical Society of America, (San Diego, CA, 11/1, 2004).

Patents:

D1. Patent applications under review

D1.1 PCT/EP2010/051320, Martin BA, "Device and method for non-invasive measurement of cerebrovascular properties," (provisional filed 2/3, 2012, Ecolé Polytechnique Fédérale de Lausanne, Switzerland).

D1.2 US 2006/0089557 A1, Liliana Grajales, Martin BA, Ion V. Nicolaescu, Iwona turlik. "Method and apparatus to facilitate heart rate detection," (published 10/27, 2004, Motorola, Inc., Schaumburg, IL).

D2. Invention disclosures

D2.1 Martin BA, Maughan M, Gibbs C, Deans B, Souvenir B, Harlow M, Aljawi M, "Biomechanical Indenter Pen," enabling disclosure, (submitted 4/2017, University of Idaho, ID).

D2.2 Martin BA, Sass L, "Anthropomorphic cerebrospinal fluid system model," invention disclosure, (filed 7/7, 2016, University of Idaho, ID).

D2.3 Pahlavian SH, Labuda R, Eppelheimer M, Loth F, Martin BA, Urbizu AS, "Software for Automated Morphometrics of Skull Based Diseases," invention disclosure, (filed 12/10, 2015, University of Akron, OH) USPTO 62/265,666.

D2.4 Martin BA, "Subject-specific prediction and optimization of intrathecal (IT) drug and gene therapy (GT) based on 4D phase contrast magnetic resonance imaging and computational modeling," invention disclosure, (filed 5/9, 2014, University of Akron, OH).

D2.5 Martin BA, "Device and method for noninvasive alteration of intracranial pressure oscillations via a cardiac triggered continuous positive airway pressure device," invention disclosure, (filed 10/12, 2012, University of Akron, OH).

D2.6 Martin BA, "Device and method for non-invasive measurement of cerebrovascular properties," invention disclosure (filed 12/11, 2009, Ecolé Polytechnique Fédérale de Lausanne, Switzerland).

D2.7 Martin BA, "Automated laser aspiration system," invention disclosure (filed 7/15, 2009, Ecolé Polytechnique Fédérale de Lausanne, Switzerland).

D2.8 Martin BA, F. Loth, "Cerebrospinal fluid system model," invention disclosure (filed 3/4, 2009, University of Akron, OH).

D2.9 Martin BA, F. Loth, "System and method for research of patient entered medical information," (filed 3/24, 2009, University of Akron, OH).

D2.10 F. Loth, Martin BA, R. Labuda, J. Oro, J. N. Oshinski, "Device and method for measurement of tension and elastic properties of the spinal cord and filum terminale," invention disclosure (filed 3/2, 2009, University of Akron, OH).

D2.11 T. J. Royston, Spohnholtz, F. Loth, Y. Yazicioglu, Martin BA, "A multimode sonic & ultrasonic diagnostic imaging method," invention disclosure (filed 3/1, 2004, University of Illinois at Chicago, IL).

D2.12 T. J. Royston, Spohnholtz, F. Loth, Martin BA, "New acoustic skin-contact hydrophone sensor array pad for medical diagnosis and monitoring," invention disclosure (filed 3/1, 2004, U. of Illinois at Chicago, IL).

Grants and Contracts Awarded:

E1. Ongoing grants (Martin as PI or mentor)

E1.1 **Investigating the Impact of Arachnoid Trabeculae on Brain Tissue Stresses in Sports-Related Traumatic Brain Injury (TBI)**
Source: NIH Grant No.P20 GM103408 (National Institute of General Medical Sciences) / Idaho INBRE
Funding: $134,692, 05/01/2017 – 04/30/2019
Investigators: Martin BA (PI), Schiele (Co-I), Potirniche (Co-I), Mortazavi (Co-I), Tanner (Co-I)

E1.2 **Hydrodynamic Simulator for Brain Therapeutic Development**
Source: Vandal Ideas Project (Internal Competitive Grant, University of Idaho)
Funding: $75,000, 07/01/2016 – 08/31/2017
Investigators: Martin BA (PI), Xing (co-I), Cleveley B (co-I)

E1.3 **Advanced Ocular and Brain MRI of Astronauts Following Long Duration Space Flight**
Source: NASA, Idaho Space Grant Consortium
Funding: $25,000, 8/1/2016-7/31/2017
Investigators: Martin BA (PI)

E1.4 **Engineering Grand Challenges Scholars**
Source: University of Idaho (internal)
Funding: $5,950, 3/1/2017-2/28/2018
Investigators: Martin BA (Mentor for G. Conley and T. Freeman)

E1.5 **Idaho INBRE Summer Undergraduate Research Fellowship**
Source: University of Idaho (internal)
Funding: $6,000, 5/10/2017-7/31/2017
Investigators: Martin BA (Mentor for G. Conley)

E1.6 **Idaho Space Grant Consortium Graduate Student Fellowship**
Source: Idaho Space Grant Consortium
Funding: $25,000, 6/2017-5/2018
Investigators: Martin BA (Mentor for MS Student, J Rohr)

E1.7 **University of Washington Medical Student Research Training Programs (MSRTP) Fellowship**
Source: Idaho Space Grant Consortium
Funding: $6,000, 6/2017-8/2018
Investigators: Martin BA (Mentor for WWAMI student, B. Lawrence)

E1.8 **Idaho Space Grant Consortium Undergraduate Student Fellowship**
Source: Idaho Space Grant Consortium
Funding: $2,500, 6/2017-5/2018
Investigators: Martin BA (Mentor for BE student Austin Sass)

E1.9 **Summer Undergraduate Research Fellowship, University of Idaho**
Source: University of Idaho (internal)
Funding: $6,000, 6/2017-8/2017
Investigators: Martin BA (Mentor for ME student Brian Aldrimk)

E2. Ongoing grants (Martin as Co-I)

E2.1 **Simulations of CSF, Hemodynamics and Ocular Risk (VIIP SCHOLAR)**
Source: NASA, NNX16AT06G
NASA Research and Technology Development to Support Crew Health and Performance in Space Exploration Missions
Funding: $750,000 total, $97,000 to Martin BA (Co-I), 10/01/2016 – 09/30/2019
Investigators: Ethier R (PI), Martin BA (Co-I)

E2.2 **Highly Accelerated Simultaneous Multi-Slice Phase Contrast MRI**
Source: NIH, NIMH, 1R44MH112210-01A1
Funding: $1,287,772 total, $29,952 to Martin BA, 08/01/2016 – 07/31/2018
Investigators: Feinberg (PI), Martin BA (Co-I)

E2.3 **Visualizing Science**
Source: Vandal Ideas Project (Internal Competitive Grant, University of Idaho)
Funding: $60,000 7/2016 – 9/2017
Investigators: Machlis S (co-PI), Rowley R (co-PI), Martin BA (Co-I)

E3. Completed grants

E3.1 **MRI-based Biomarkers for Amyotrophic Lateral Sclerosis**
Source: 4U54GM104944-04 NIH General Medical Sciences (CTR – Infrastructure Network)
Funding: $68,500, 8/1/2016-6/30/2017
Investigators: Martin BA (PI)

E3.2 **Biomechanical Characterization and Modeling of Arachnoid Trabeculae in Traumatic Brain Injury**
Source: NIH Grant No.P20 GM103408 (National Institute of General Medical Sciences) / Idaho INBRE
Funding: $13,357, 1/1/2017-4/30/2017
Investigators: Martin BA (PI)

E3.3 **A subject-specific computational simulator of intrathecal drug dispersion in non-human primates**
Source: Voyager Therapeutics
Funding: $166,953, 09/2015-9/2016
Investigators: Martin BA (PI)

E3.4 **Multicenter in vitro assessment of 4D PC MRI for quantification of CSF motion**
Source: American Syringomyelia and Chiari Alliance Project
Funding: $53,568 to Martin BA, 08/2013 – 05/2016
Investigators: Martin BA (PI)

E3.5 **Identification of MRI parameters and genetic factors for diagnosis of Chiari malformation**
Source: Chiari and Syringomyelia Patient Education Foundation
Funding: $22,296, 03/2015 – 03/2016
Investigators: Martin BA (PI)

E3.6 **MRI morphometric traits of Type 1 Chiari malformation across age and gender**
Source: Chiari and Syringomyelia Patient Education Foundation
Funding: $37,840, 03/2015 – 03/2016
Investigators: Martin BA (PI)

E3.7 **A Chiari Malformation MR image database**
Source: Chiari and Syringomyelia Patient Education Foundation
Funding: $61,064, 04/2014-03/2016
Investigators: Loth F (PI), Martin BA (Co-I)

E3.8 **MRI-directed identification of genetic risk factors in Chiari Malformation in men and women**
Source: Fundacion Ramon Areces Post-doctoral Fellowship Award
Funding: 36,000 EUR, 10/2014-10/2016
Investigators: Martin BA (mentor), Urbizu A (post-doc fellow)

E3.9 **MRI quantification of brain and nerve damage in Chiari I malformation**
Source: Chiari and Syringomyelia Patient Education Foundation
Funding: $142,177, 02/2013 – 12/2015
Investigators: Martin BA (co-PI)

E3.10 **Transcriptional profiling and μCT assessment of a syringomyelia rat model**
Source: Chiari and Syringomyelia Patient Education Foundation
Funding: $97,651, 10/2012 – 10/2015
Investigators: Leipzig N (PI), Martin BA (Co-I)

E3.11 **MRI Based Classification of Chiari Malformation**
Source: Chiari and Syringomyelia Patient Education Foundation
Funding: $33,309, 01/2014-06/2015
Investigators: Espanol M (PI), Martin BA (Co-I)

E3.12 **Metabolic and Inflammatory Alterations in Patients with Chiari Malformation**
Source: Chiari and Syringomyelia Patient Education Foundation
Funding: $59,053, 01/2014-06/2015
Investigators: Shriver L (PI), Martin BA (Co-I)

E3.13 **An in vitro assessment of 4D PC MRI quantification of cerebrospinal fluid dynamics**
Source: Swiss Nat. Science Foundation (Grant No. IZK0Z2_152766), Int. Short Visit
Funding: $12,228, 04/2014 – 06/2014
Investigators: Fornari E (PI), Martin BA (Co-I)

E3.14 **Pressure oscillations: a new lung therapy approach**
Source: Marie Curie Actions (Grant No. FP7-PEOPLE-2011-IIF) Int. Incoming Fellowships
Funding: $166,252, 10/2012-10/2013
Investigators: Martin BA (Co-I), Al-Jumaily A (Co-I), Stergiopulos N (administrator)

E3.15 **Development of a coupled hydrodynamic model of the cardiovascular and cerebrospinal fluid system** Source: Swiss National Science Foundation (Grant No. 205321_132695 / 1)
Funding: 351,976 CHF direct, 01/2010-09/2013)
Investigators: Stergiopulos N (PI), Martin BA (Co-I)

E3.16 **A model system for teaching neurohydrodynamics**
Source: NSF, SBIR Phase I (Grant No. 1214752)
Funding: $149,763, 2012
Investigators: Radojicic M (PI), Martin BA (consultant)

Honors and Awards:

Medical Advisory Panel Member for the Chiari Project Foundation	2017 –
Elected Executive Board Member of the International Society for Hydrocephalus and CSF Disorders	2015 – 2017
Distinguished Alumni Award, College of DuPage, Glen Ellyn, IL	2015
Outstanding researcher award from Conquer Chiari Patient Education Foundation	2013
Keynote Speaker at Akron General Hospital Post-grad Symposium (06/06, 2013), Akron, OH.	2013
NPR radio on my research, WKSU 89.7, “Engineering a Chiari breakthrough,” (03/04, 2013)	2013
Co-leader of the International Hydrocephalus Imaging Working Group, New York, NY, U.S.A.	2011 –
Board of Director member of the International Cerebrospinal Fluid Dynamics Society	2011 –
Selected as entrepreneurial speaker at the medTech IP conference (06/21, 2010), Anaheim, CA	2010

SERVICE:

Major Committee Assignments:

National review panels and committees:

NASA, Human Research Program (HRP), Visual Impairment Intracranial Pressure Syndrome	2017 March
NIH, Common Data Elements, Chiari I Malformation, Imaging Diagnostics Panel Member	2016
NIH, Bioengineering, Technology and Surgical Sciences Study Section, Review Panel	2016 June
American Heart Association, Bioengineering Clinical Committee, Review Panel	2016 October
American Heart Association, Bioengineering Clinical Committee, Review Panel	2016 April
NIH NINDS Common Data Elements Committee for Chiari Malformation	2016
American Heart Association, Bioengineering Clinical Committee, Review Panel	2015 March
NASA, Non-Advocate Review Panel Member, Review Panel	2014
Auckland University of Technology (AUT), Strategic Research Investment Fund, Review Panel	2014

University:

P&T Review Committee for Biological Engineering, Full Professor (1)	2016
P&T Review Committee for Mathematics, Assistant Professor (1)	2016

College:

College Marshall for 2016 Fall Commencement	2016

Departmental:

Biological Engineering Department ByLaw Committee	2016
Biological Engineering Facebook page manager (published 30+ articles)	2016
Meetings with potential BE students (20+ students for 30 minute meetings)	2015 – present
Led Biological Engineering new student enrollment outreach event at Moscow High School	2016
Calling campaign, called 10+ potential BE students	2016F
Calling campaign, called 10+ potential BE students	2017S

Professional and Scholarly Organizations

Society leadership:

Biofluids and Biotransport Session, Chair and Organizer, World Congress on Biomechanics	2017 – 2018
Biofluids Theme Abstract Chair, SB^3C, Summer Bioengineering, Biomechanics, Biotransport –	2017
Executive Board Member, International Society for Hydrocephalus and CSF Disorders	2015 – 2017
Co-leader and Board Member, International Hydrocephalus Imaging Working Group, IHIWG.org	2011 – present
Executive Board Member, International CSF Dynamics Society	2012 – present
Biofluids Theme Chair, Summer Biomechanics, Bioengineering, Biotransport Conference (SB^3C)	2016 – present
Board Member, The Chiari Project Foundation	2017 – present

Professional society membership:

ASME, American Society of Mechanical Engineers, Biomedical Engineering Division	2004 – Present
BMES, Biomedical Engineering Society	2015 – Present
ASNR, American Society of Neuroradiology	2012 – Present
ISMRM, International Society of Magnetic Resonance Imaging	2014 – Present
ISHCFD, International Society for Hydrocephalus and Cerebrospinal Fluid Disorders	2011 – Present
APS, American Physiological Society	2011 – 2015
ISCBFM, International Society for Cerebral Blood Flow and Metabolism	2009 – 2015
International Spinal Cord Society	2011
American Syringomyelia Alliance Project	2006 – 2007
ASA, Acoustical Society of America	2005
BMES, Biomedical Engineering Society	2006
EWB, Engineers Without Borders U.S.A.	2003 – 2007

Journal reviewer for:

2 papers reviewed in 2017
9 papers reviewed in 2016
4 papers reviewed in 2015

American Journal of Physiology: Heart and Circulatory Physiology
ASME Journal of Biomechanical Engineering
Acta Neurologica Scandanavica
Developmental Neurorehabilitation
Fluids and Barriers of the CNS
IEEE Transactions on Biomedical Engineering
Medical Engineering and Physics
Neuroradiology
Neurosurgery
Journal of Biomechanics
Journal of Neurology, Neurosurgery, and Psychiatry
Journal of Neuroscience
PLOS one
Royal Society – Interface Focus
World Neurosurgery

Abstract reviewer for:

Summer Biomechanics, Bioengineering and Biotransport Meeting (SB3C.com)	2016
Summer Biomechanics, Bioengineering and Biotransport Meeting (SB3C.com)	2015
World Congress on Biomechanics	2014
American Society of Mechanical Engineers, Summer Bioengineering Conference	2012 – 2013

Student presentation judge for:

American Society of Mechanical Engineers, Summer Bioengineering Conference	2010 – 2015

F1. Conferences organized

F1.1 Hydrocephalus 2017, Hydrocephalus Society Conference (Kobe, Japan, 10/23-25, 2017), *International organizing & scientific committee.*

F1.2 International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Cartagena, Colombia, 10/8-11, 2016), *International organizing & scientific committee.*

F1.3 "Summer Biomechanics, Biotransport and Bioengineering Conference (SB^3C)," (Snowbird, UT, U.S.A., 6/17-20, 2015), *Member at Large, Conference Organizing Committee*.

F2.1 "2nd CSF International CSF Dynamics Symposium," Feinstein Institute for Medical Research (Long Island, NY, 06/24-25, 2013), *Co-organizer and Conference Chair*.

F2.2 "1st Conquer Chiari Research Center Open House," Engineering Research Center, University of Akron (Akron, OH, 04/27, 2013), *Conference Organizer*.

F2. Symposiums and workshops organized

F2.3 "International Hydrocephalus Imaging Working Group Symposium (IHIWG)," International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Kobe, Japan, 10/23-25, 2017), *Co-organizer*.

F2.4 "Biomechanics of the Central Nervous System," Track: Biofluids and Biotransport, World Congress on Biomechanics (Dublin, Ireland, 07/8-12, 2018), *Session Organizer*.

F2.5 54th Meeting of the American Society of Neuroradiology, "CSF Flow Study Group (IHIWG)" (Long Beach, CA, U.S.A., 04/27-28, 2017), *Co-Organizer*.

F2.6 "International Hydrocephalus Imaging Working Group Symposium (IHIWG)," International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Cartagena, Colombia, 10/8-11, 2016), *Co-organizer*.

F2.7 53rd Meeting of the American Society of Neuroradiology, "CSF Flow Study Group (IHIWG)" (Washington, D.C., U.S.A., 05/26-27, 2016), *Co-Organizer*.

F2.8 "International Hydrocephalus Imaging Working Group Symposium (IHIWG)," International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Banff, Canada, 09/17, 2015), *Chair and Co-organizer*.

F2.9 "International Hydrocephalus Imaging Working Group Symposium (IHIWG)," International Society of Hydrocephalus and CSF Dynamics Disorders (ISHCSFD) Conference (Bristol, UK, 09/5-6, 2014), *Organizer and Co-chair*.

F2.10 "CSF Dynamics Mini-Symposia," World Congress on Biomechanics (Boston, MA, 06/11, 2014), *Organizer and Co-chair*.

F2.11 "Hydrocephalus and CSF Flow Working Group," 52nd Meeting of the American Society of Neuroradiology, ASNR (Montreal, Canada, 05/22-23, 2014), *Co-organizer*.

F2.12 "Controversies in Hydrocephalus and CSF Flow (IHIWG) Workshop," 51st Meeting of the American Society of Neuroradiology (San Diego, CA, 05/23-24, 2013), *Co-organizer*.

F3. Conference sessions chaired/co-chaired

F2.13 "Biomechanics of the Central Nervous System," Track: Biofluids and Biotransport, World Congress on Biomechanics (Dublin, Ireland, 07/8-12, 2018), *Session Chair*.

F3.1 "MR Elastography," IHIWG / ISHCSFD Conference (Banff, Canada, 09/18, 2015), Session Chair.

F3.2 "Pathophysiology of type 1 Chiari malformation," American Society of Neuroradiology, CSF flow study group (Chicago, IL, 5/1, 2015), *Session Chair*.

F3.3 "Cerebrospinal fluid MRI diagnostics," International Society of Hydrocephalus and CSF disorders (Bristol, UK, 09/5-8, 2014), *Session Chair*.

F3.4 "Cerebrospinal Fluid Dynamics Symposium," 7th World Congress of Biomechanics (Boston, MA, U.S.A., 06/06-11, 2014), *Session Chair*.

F3.5 "Session D," 1st International CSF Dynamics Symposium, Swiss Federal Institute of Technology (Zurich, Switzerland, 07/08/2011), *Session Chair*.

F3.6 "Session G: Spinal Cord," 2nd International CSF Dynamics Symposium, Feinstein Institute for Medical Research (Manhasset, NY, 06/25/2013), *Session Chair*.

Outreach Service:

G9. Publicity and media coverage of research

G9.1 "Research shows astronauts' vision can get worse in space." 7/6/2017, (KREM channel 2 news, Spokane, WA, http://www.krem.com/news/local/latah-county/research-shows-astronauts-vision-can-get-worse-in-space/454790398).

G9.2 "Blind Spot, Humans have long dreamed of traveling through the far reaches of space – populating other planets and creating societies there. NASA has announced it hopes to send humans to Mars in the 2030. But how do you "boldly go where no one have gone before" if you can't see where you are going?" (University of Idaho, Here We Are Idaho, Alumni Magazine, Spring 2017, https://issuu.com/uidaho/docs/hwhi-2017_spring_56pgs_issuu).

G9.3 "Fit to serve, Fit to Serve: Biological Engineering Student Feeds the Homeless, Fights Wildfires and Prepares for Medical School," (University of Idaho, College of Engineering, 2017, https://www.uidaho.edu/engr/news/features/christina-gibbs).

G9.4 "Engineering student uses mapping and imaging to reveal unknown," (University of Idaho, Vandals in Focus 2017, student research magazine, https://goo.gl/z1bHlF).

G9.5 Pritchard Art Gallery, "Visualizing Science - Nebulus," Installation by Casey Doyle and Bryn Martin," (Moscow, ID, 2/10/2017 – 4/15/2017, https://www.uidaho.edu/caa/galleries-centers-and-labs/prichard/exhibits/vscience).

G9.6 University of Idaho Video Publicity Feature, "Visualizing Science, Casey Doyle & Bryn Martin," (Moscow, ID, 4/19/2017, https://www.youtube.com/watch?v=pfS707Pw19w).

G9.7 Inland 360.com, "Art: visualizing science channels fact through imagination," (Jennifer K Bauer, Spokane, WA, 3/8/2017, https://goo.gl/2h61dU).

G9.8 Moscow-Pullman Daily News, "UI senior works to cure cancer," (Josh Babcock, Moscow, ID, 5/14, 2016, http://goo.gl/rCdWiC).

G9.9 National Public Radio, WKSU, Exploradio, "Engineering a Chiari breakthrough," (Jeff St. Clair, Kent, OH, 3/4, 2013, http://bit.ly/16JdIut), re-aired several times in 2014.

G9.10 Akron Beacon Journal, "UA tackles brain disorder," (Cheryl Powell, Akron, OH, 6/25, 2012, http://bit.ly/ZTdjiv).

G9.11 University of Akron Online Newsroom, "When does a headache need an engineer to fix it?," (6/24, 2012, http://bit.ly/ZKeJxl).

G9.12 Scicasts, "University receives funding for research center to treat patients with Chiari malformation," (6/27, 2012, http://bit.ly/OvrlpE).

G9.13 Chiari and Syringomyelia Foundation, New Researchers Feature, "The influence of coughing on cerebrospinal fluid pressure in an in vitro syringomyelia model with spinal subarachnoid space stenosis," (6/1, 2009, http://bit.ly/13buPpY).

G9.14 Conquer Chiari Foundation, In the Spotlight, "Dr. Bryn Martin, CCRC Director," (7/1, 2012, http://bit.ly/XYZdQ5).

Community Service: (non-academic unrelated to employment)
Sponsor and donor, Family Promise of the Palouse, Interfaith Hospitality Network for Homeless Families

Honors and Awards:
None.

PROFESSIONAL DEVELOPMENT:

Teaching:
None.

Scholarship:
See above F1-F3 for conferences/symposiums/workshops attended.

Outreach:

Presentation	"Reverse Engineering the Brain" Idaho INBRE Summer Undergraduate Fellows	05/22/17
Lab tour	"Neurophysiological Imaging and Modeling Laboratory" Eng. Grand Challenges	2017
Outreach	Led Biological Engineering new student enrollment outreach event at Moscow High School	2016

Administration/Management:
None.